

Appl. No. : 10/066,169
Filed : January 30, 2002

COMMENTS

In response to the Office Action mailed August 5, 2004, Applicants respectfully request the Examiner to reconsider the above-captioned application in view of the foregoing amendments and the following comments.

Matters of Form

Applicants have amended Claim 14 to correct typographical errors.

Anticipation rejections

Claim 14 stands rejected under 35 U.S.C. 102(b) as anticipated by Chowdhury. Applicants respectfully traverse the rejection of this claim because an anticipation rejection under Section 102(b) is proper only if a single reference shows every element of the claim, arranged as in the claim. MPEP §2131

Claim 14 recites, in part, "a gas conduit system that connects the reactant source and the reaction chamber; a valve positioned in the gas conduit system such that switching of the valve induces vapor phase reactant pulses from the reactant source to the reaction chamber; [and] a first sensor that is in communication with the gas conduit system and provides a first signal indicative of a first characteristic parameter of the reactant pulses as a function of time."

In contrast, Chowdhury discloses the use of mass spectroscopy to observe, in real time, the gas composition within the exhaust port or within the reaction chamber. See page 128, first paragraph. Chowdhury does not disclose, teach or suggest placing the mass spectroscopy device in communication with the gas conduit system that connects the reactant source to the reactant chamber. Rather, Chowdhury's sensor is downstream of its corresponding gas conduit system, which connects the reaction source to the reaction. The sensor therefore does not communicate with the conduits between the reactant source and the reaction chamber.

For at least this reason, the rejection of Claim 14 as anticipated by Chowdhury is in error.

Rejections under 35 U.S.C. 103(a)

Claims 1-43 stand rejected under 35 U.S.C. 103(a) as unpatentable over Min in view of Chowdhury and further in view of Schmitt (USPN 6,038,919). Applicants respectfully traverse the rejection of these claims.

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Independent Claim 1 recites, in part, "providing a gas conduit system to connect the reactant source to the reaction chamber" and "providing a first sensor that is in communication with the conduit system." As noted above, independent Claim 14, recites, in part, an apparatus which comprises "a gas conduit system that connects the reactant source and the reaction chamber" and "a first sensor that is in communication with the gas conduit system." Independent Claim 25 recites, in part, "providing a conduit system to connect the reactant source to the reactant chamber" and providing "a first sensor that is in communication with the gas conduit system." Independent Claim 35 recites, in part, a method comprising "monitoring a characteristic parameter in a conduit that communicates with a reactant source container in the ALD system."

Thus, all of the pending claims recite that the sensor is in communication with the conduit that connects the reactant source to the reaction chamber or monitoring the conduit that is in communication with the reaction source container.

However, as noted above, Chowdhury does not disclose, teach or suggest placing the mass spectroscopy device in communication with the gas conduit that connects the reactant source to the reactant chamber. Rather, Chowdhury's sensor is downstream of such conduits. This distinction is important. Applicants' recited sensor or monitoring location enables determination of the remaining reactant in the source. Chowdhury's location does not, since Chowdhury senses chemicals after reaction. Measurements at this point cannot accurately reflect an amount of reactant left in the source container.

Min merely discloses an exemplary ALD reactor and a method of operating such an ALD reactor.

Schmitt discloses a method for determining how much solid or liquid precursor is left in a container. The method involves closing an outlet of the container to define a measurement volume. Col. 4, lines 2-10. A metered amount of gas is then delivered to the measurement volume, while the pressure in the measurement volume is monitored. *Id.* The pressure is used to calculate the amount of pressure remaining in the container. Col. 4, lines 35-65. The pressure is measured by a pressure detector 40 which is positioned along the carrier gas inlet conduit 26 and not in the conduit 6, 8, 14, which is in communication with the process chamber. See Figure 1. In addition, there is no suggestion to employ a mass spectroscopy system like that of Chowdhury into the method and apparatus disclosed in Schmitt in which a pressure sensor is used.

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Accordingly, the cited references, either alone or in combination, do not disclose, teach or suggest monitoring a characteristic parameter in a conduit that connects the reactant source with the reaction chamber. For at least this reason, Applicant submits that Claims 1-43 are in condition for allowance.

CONCLUSION

For the foregoing reasons, it is respectfully submitted that the rejections set forth in the outstanding Office Action are inapplicable to the present claims. Accordingly, early issuance of a Notice of Allowance is most earnestly solicited.

The undersigned has made a good faith effort to respond to all of the rejections in the case and to place the claims in condition for immediate allowance. Nevertheless, if any undeveloped issues remain or if any issues require clarification, the Examiner is respectfully requested to call Applicant's attorney in order to resolve such issue promptly.

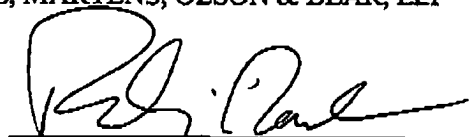
Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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Dated: November 5, 2004

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